16(1)

AUTHOR: Dzhrbashyan, M.M., Academician AS Arm SSR

SOV/20-125-4-4/74

TITLE: The Development of Meromorphic Functions in the Generalized Maclaurin Series (Razlozheniye meromorfnykh funktsiy v obobshchennyy ryad Maklorena)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 4, pp 707-710 (USSR)

ABSTRACT: Let $\{a_k\}$ be a complex number sequence, $1 < |a_0| \leqslant |a_1| \leqslant \cdots \leqslant |a_n| \leqslant \cdots$, $\lim\limits_{k\to\infty} |a_k| = \infty$. Let $R\{a_k\}$ be the class of functions $\Phi(z)$ meromorphic in the whole plane and having poles in the points $\{a_k\}$. Let $\alpha_k = \frac{1}{\bar{a}_k}$. Given the system

$$\varphi_0(z) = \left(\frac{1-|\alpha_0|^2}{2\pi}\right)^{1/2} \frac{1}{1-\bar{\alpha}_0 z}$$

$$\varphi_n(z) = \left(\frac{1-|\alpha_n|^2}{2\pi}\right)^{1/2} \frac{1}{1-\bar{\alpha}_n z} \prod_{k=0}^{n-1} \frac{z-\alpha_k}{1-\bar{\alpha}_k z}, \quad n = 1,2,\ldots.$$

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Theorem: Let $\phi(z) \in R\left\{\frac{1}{\bar{\alpha}_k}\right\}$. Then there holds the development

$$\phi(z) = \sum_{n=0}^{\infty} c_n \varphi_n(z)\ , \quad c_n = \int_{|\zeta|=1} \phi(\zeta)\overline{\varphi_n(\zeta)}\,|d\zeta|, \quad n = 0,1,2,\ldots$$

The development converges uniformly and absolutely in every bounded and closed domain not containing the points $\left\{\frac{1}{\bar{\alpha}_k}\right\}$. For the coefficients c_n there also holds the representation

$$c_n = \frac{\sqrt{(1-|\alpha_n|^2)(1-|\alpha_{n+1}|^2)}}{2\pi i} \int_{|\zeta|=R} \phi(\zeta) \frac{d\zeta}{(1-\bar{\alpha}_n\zeta)(1-\bar{\alpha}_{n+1}\zeta)\varphi_{n+1}(\zeta)}\ ,$$

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where for the given n, $n=0,1,2,\ldots.$ R is an arbitrary number of a suitably chosen interval $(|\alpha_0|, l_n)$.

There are 3 references, 1 of which is Soviet, 1 American, and 1 German.

SUBMITTED: December 17, 1958

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SOV/20-128-3-6/58

16(1)

AUTHOR: Dzhrbashyan, M.M., Academician, Academy of Sciences, Armyanskaya SSR

TITLE: Quasi-Isometric Mapping of the Spaces of Functions $L^2_{\sigma_1}(a_1,b_1)$, $L^2_{\sigma_2}(a_2,b_2)$

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 3, pp 456-459 (USSR)

ABSTRACT: Let $\sigma_k(x)$ $(k=1,2)$ be a nondecreasing function defined on (a_k,b_k) and continuous from the right which is of bounded variation on $[\alpha,\beta] \subset (a_k,b_k)$. To the class $L^2_{\sigma_k}(a_k,b_k)$ there belong all $f(x)$ being σ_k-measurable on (a_k,b_k) and for which it is $\int_{a_k}^{b_k} |f(x)|^2 d\sigma_k(x) < +\infty$, the integral understood in the sense of Lebesgue-Stieltjes. Let $(f_1,f_2)_{\sigma_k} = \int_{a_k}^{b_k} f_1(x)\overline{f_2(x)}d\sigma_k(x)$ and $\|f\|_{\sigma_k} = (f,f)^{1/2}_{\sigma_k}$.

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Quasi-Isometric Mapping of the Spaces of Functions $L^2_{\sigma_1}(a_1,b_1)$, SOV/20-128-3-6/58
$L^2_{\sigma_2}(a_2,b_2)$

The author constructs direct and inverse quasi-isometric integral transformations of the function spaces $L^2_{\sigma_1}(a_1,b_1)$ and $L^2_{\sigma_2}(a_2,b_2)$ one into the other, whereby these transformations are generated by kernels which are adjacent in a certain sense to the kernels of corresponding isometric mappings of the same spaces. Theorem 1 generalizes the theorem of Bochner [Ref 1] on isometric operators in the case of the spaces $L^2(a,b)$. Theorem 2 is a generalization of the theorem of Paley-Wiener [Ref 3] on isometric mappings of $L^2(a,b)$ and $L^2_{[x]}(0,+\infty)$. Theorem 3 gives a further generalization of theorem 1.

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Quasi-Isometric Mapping of the Spaces of Functions $L^2_{\sigma_1}(a_1,b_1)$, $L^2_{\sigma_2}(a_2,b_2)$

There are 3 American references.

ASSOCIATION: Institut matematiki i mekhaniki AN Arm SSR (Institute of Mathematics and Mechanics AS Armyanskaya SSR)

SUBMITTED: July 3, 1959

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S/022/60/013/003/008/008 XX
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AUTHOR: Dzhrbashyan, M.M.

16

TITLE: On Integral Transformations Generated by a Generalized Function of the Type of Mittag - Löffler

PERIODICAL: Izvestiya Akademii nauk Armyanskoy SSR. Seriya fiziko-matematicheskikh nauk, 1960, Vol. 13, No. 3, pp. 21 - 63

TEXT:

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$$(1.1) \qquad \phi_{\rho_1, \rho_2}(z; \mu_1, \mu_2) = \sum_{k=0}^{\infty} \frac{z^k}{\Gamma(\mu_1 + k\rho_1^{-1})\,\Gamma(\mu_2 + k\rho_2^{-1})}$$

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is denoted as a generalized function of the type of Mittag - Löffler, where $\rho_1, \rho_2 \in (0, +\infty)$, $\mu_1, \mu_2 \in (-\infty, \infty)$ are arbitrary parameters. (1.1) is an entire function of the order

$$(1.2) \qquad \rho = \frac{\rho_1 \rho_2}{\rho_1 + \rho_2}$$

and of the type

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(1.3) $$\sigma = \left(\frac{\varsigma_1}{\varsigma}\right)^{\frac{\varsigma}{\varsigma_1}} \left(\frac{\varsigma_2}{\varsigma}\right)^{\frac{\varsigma}{\varsigma_2}} .$$

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In the limiting case one obtains

(1.8) $$\phi_{\varsigma, \infty}(z; \mu, 1) = \phi_{\infty, \varsigma}(z; 1, \mu) = E_{\varsigma}(z; \mu) ,$$

where $E_{\varsigma}(z, \mu)$ was investigated by the author in (Ref. 1). It is

(1.12) $$J_{\nu}(z) = \left(\frac{z}{2}\right)^{\nu} \phi_{1,1}\left(-\frac{z^2}{4}; 1, \nu + 1\right) .$$

It holds the integral relation

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$$(1.17) \int_0^\infty \phi_{\varsigma_1,\varsigma_2}(zt^{\frac{1}{\alpha}};\mu_1,\mu_2)\, t^{\beta-1} e^{-\zeta t} dt =$$

$$= \zeta^{-\beta} \sum_{k=0}^{\infty} \frac{\Gamma(\beta + k\alpha^{-1})}{\Gamma(\mu_1 + k\varsigma_1^{-1})\Gamma(\mu_2 + k\varsigma_2^{-1})} \left(\frac{z}{\zeta^{\frac{1}{\alpha}}}\right)^k ,$$

where $\alpha \geqslant \varsigma$, $\beta > 0$, z complex, Re $\zeta > 0$ for $\varsigma < \alpha$ and Re $\zeta > \sigma |z|^{\varsigma}$ for $\varsigma = \alpha$, where ς and σ are given by (1.2), (1.3). There hold the integral representations :

$$(1.26) \qquad \phi_{\varsigma,\varsigma}\left(\frac{z}{4^{1/\varsigma}}, \nu_1, \nu_2\right) =$$

$$= \frac{2^{2(\nu_1 - 1)}}{\sqrt{\pi}\,\Gamma\left(\nu_2 - \nu_1 + \frac{1}{2}\right)} \int_0^1 E_{\frac{\varsigma}{2}}(zt^{\frac{1}{\varsigma}};\ 2\nu_1 - 1)(1 - t)^{\nu_2 - \nu_1 - \frac{1}{2}} t^{\nu_1 - \frac{3}{2}} dt \quad ,$$

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where $\varsigma > 0$ is arbitrary, $\nu_2 > \nu_1 - \frac{1}{2} > 0$; furthermore

$$(1.28)\quad \phi_{\varsigma_1,\varsigma_2}(z;\mu_1,\mu_2) = \frac{\varsigma_1}{2\pi i}\int_{\gamma(\varepsilon,\alpha)} e^{t^{\varsigma_1}} t^{\varsigma_1(1-\mu_1)-1} E_{\varsigma_2}\left(\frac{z}{t};\mu_2\right)dt$$

if $\varsigma_1 > \frac{1}{2}$, $\varsigma_2 > 0$, $-\infty < \mu_1, \mu_2 < +\infty$, $\frac{\pi}{2\varsigma_1} < \alpha \leq \min\left\{\pi, \frac{\pi}{\varsigma}\right\}$ and

$$(1.29)\quad \phi_{\frac{1}{2},\varsigma_2}(z;\mu_1,\mu_2) = \frac{1}{4\pi i}\int_{\gamma(\varepsilon;\pi)} e^{t^{\frac{1}{2}}} t^{\frac{1}{2}-\frac{\mu_2+1}{2}} E_{\varsigma_2}\left(\frac{z}{t},\mu_2\right)dt$$

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if $\varsigma_1 = \frac{1}{2}$, $\varsigma_2 > 0$, $\mu_1 > 0$, $-\infty < \mu_2 < +\infty$; here $\gamma(\varepsilon;\alpha)$, $\varepsilon > 0$, $0 < \alpha \leq \pi$ is a contour consisting of $\arg t = -\alpha$, $|t| \geq \varepsilon$; $-\alpha \leq \arg t \leq +\alpha$ of the circle $|t| = \varepsilon$ and of $\arg t = +\alpha$, $|t| \geq \varepsilon$.

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For the investigation of further properties of $\phi_{\varsigma_1,\varsigma_2}(z;\mu_1,\mu_2)$ the author introduces the meromorphic functions

(2.1) $$K_{\varsigma_1,\varsigma_2}(s;\mu_1,\mu_2;\alpha) \equiv K_{\varsigma_1,\varsigma_2}(s;\alpha) =$$

$$= \frac{\pi^{\frac{3}{2}}\varsigma\, e^{i\varsigma(s+\mu-1)(\pi-\alpha)}}{\sin\pi\varsigma(s+\mu-1)\,\Gamma\left(\mu_1-\frac{\varsigma}{\varsigma_1}\mu+\frac{\varsigma}{\varsigma_1}(1-s)\right)\Gamma\left(\mu_2-\frac{\varsigma}{\varsigma_2}\mu+\frac{\varsigma}{\varsigma_2}(1-s)\right)}$$

and (2.2) $$H^{(\pm)}_{\varsigma_1,\varsigma_2}(s;\mu_1,\mu_2) \equiv H^{(\pm)}_{\varsigma_1,\varsigma_2}(s) =$$

$$= \pi^{-\frac{1}{2}} e^{\pm i\frac{\pi}{2}s}\,\Gamma\left(\mu_1-\frac{\varsigma}{\varsigma_1}\mu+\frac{\varsigma}{\varsigma_1}s\right)\Gamma\left(\mu_2-\frac{\varsigma}{\varsigma_2}\mu+\frac{\varsigma}{\varsigma_2}s\right)$$

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$(s = \sigma + it)$.

Lemma 3: a) Under the assumption

(2.21) $\frac{1}{2} < \mu < \frac{1}{2} + \min\left\{\frac{1}{\varsigma}, \frac{\mu_1 \varsigma_1}{\varsigma}, \frac{\mu_2 \varsigma_2}{\varsigma}\right\}$

there exist in the mean the limit values

(2.22) $\frac{k_{\varsigma_1, \varsigma_2}(x; \alpha)}{x} = \frac{1}{2\pi i} \underset{a \to +\infty}{\mathrm{l.i.m.}} \int_{\frac{1}{2} - ia}^{\frac{1}{2} + ia} \frac{K_{\varsigma_1, \varsigma_2}(s; \alpha)}{\sqrt{2\pi\varsigma}\,(1-s)} x^{-s} ds \in L_2(0, +\infty)$,

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$$(2.23)\quad \frac{h^{(\pm)}_{\varsigma_1,\varsigma_2}(x)}{x} = \frac{1}{2\pi i}\ \underset{a\to+\infty}{\text{l.i.m.}} \int_{\frac{1}{2}-ia}^{\frac{1}{2}+ia} \frac{H^{(\pm)}_{\varsigma_1,\varsigma_2}(s)}{\sqrt{2\pi\varsigma}(1-s)}\, x^{-s}ds \in L_2(0,+\infty) \quad .$$

b) If $\varsigma_1 = \varsigma_2 = \mu_2 = 1$ and

$$(2.21')\qquad 0 < \mu_1 < +\infty \quad ,$$

then there exist in the mean the limit values

$$(2.22')\quad \frac{k(x;\mu_1)}{x} = \frac{1}{2\pi i}\ \underset{a\to+\infty}{\text{l.i.m.}} \int_{\frac{1}{2}-ia}^{\frac{1}{2}+ia} \frac{K_{1,1}(s;\pi)}{\sqrt{\pi}(1-s)}\, x^{-s}ds \in L_2(0,+\infty)$$

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$$(2.23') \quad \frac{h(x;\mu_1)}{x} = \frac{1}{2\pi i} \underset{a\to+\infty}{\mathrm{l.i.m.}} \int_{\frac{1}{2}-ia}^{\frac{1}{2}+ia} \frac{H_{1,1}(s)}{\sqrt{\pi}(1-s)} x^{-s} ds \in L_2(0, +\infty).$$

Lemma 4: a) Under the assumption (2.21) it holds

$$(2.24) \quad k_{\varsigma_1,\varsigma_2}(x;\alpha) = \frac{1}{\sqrt{2\varsigma}} \int_0^x \Phi_{\varsigma_1,\varsigma_2}(e^{i\alpha} t^{\frac{1}{\varsigma}}; \mu_1,\mu_2) t^{\mu-1} dt =$$

$$= \frac{1}{\sqrt{2\varsigma}} \sum_{k=0}^{\infty} \frac{(e^{i\alpha} x^{\frac{1}{\varsigma}})^k x^{\mu}}{\Gamma(\mu_1 + k\varsigma_1^{-1})\Gamma(\mu_2 + k\varsigma_2^{-1})(\mu + k\varsigma^{-1})}$$

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for all $\alpha \in \left[\frac{\pi}{2\varsigma}, 2\pi - \frac{\pi}{2\varsigma}\right]$. b) Under the assumption (2.21') it holds

(2.24') $$k(x; \mu_1) = \int_0^x J_{\mu_1 - 1}(2t)\, t^{\frac{1}{2}} dt =$$

$$= \sum_{k=0}^{\infty} (-1)^k \frac{x^{2k+\mu_1+\frac{1}{2}}}{\Gamma(1+k)\,\Gamma(\mu_1+k)\left(\mu_1+\frac{1}{2}+2k\right)} .$$

For the function $h^{(\pm)}_{\varsigma_1,\varsigma_2}(x)$ the author gives a result analogous to the lemma 4.

These results are used in order to construct integral transformations with

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the kernels $\frac{h^{(\pm)}_{\varsigma_1,\varsigma_2}(x)}{x}$ and $\frac{k_{\varsigma_1,\varsigma_2}(x,\alpha)}{x}$ in the classes L_2. Here it is assumed that a) it holds

(3.1) $$\frac{1}{\varsigma} = \frac{1}{\varsigma_1} + \frac{1}{\varsigma_2}$$

where

(3.1') $$\tfrac{1}{2} \le \varsigma_1 < +\infty , \quad \tfrac{1}{2} \le \varsigma_2 \le +\infty , \varsigma \ge \tfrac{1}{2} .$$

b) It holds

(3.2) $$\mu = \mu_1 + \mu_2 - \tfrac{1}{2} , \quad \mu_1 > 0 , \quad \mu_2 > 0 ,$$

where

(3.2') $$\mu_2 = \tfrac{1}{2}$$

for $\varsigma_2 = +\infty$. c) It holds

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(3.3) $$\frac{1}{2} < \mu < \frac{1}{2} + \frac{1}{\varrho} \min\left\{1, \mu_1 \varrho_1, \mu_2 \varrho_2\right\},$$

where in the case $\varrho_1 = \varrho_2 = \mu_2 = 1$ it holds

(3.3') $$0 < \mu_1 < +\infty .$$

Theorem 1: For every $g(y)$ of the class $g(y)y^{\mu-1} \in L_2(0, +\infty)$,

(3.4) $$f^{(\pm)}(x) = \frac{d}{dx}\int_0^\infty \frac{h^{(\pm)}_{\varrho_1,\varrho_2}(xy)}{y} g(y)y^{\mu-1}dy, \quad x \in (0, +\infty)$$

defines almost everywhere functions $f^{(+)}(x)$ and $f^{(-)}(x) \in L_2(0, +\infty)$.
The dual formula

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$$(3.5)\quad g(y)y^{\mu-1} = e^{-i\frac{\pi}{2}(1-\mu)} \frac{d}{dy}\int_0^\infty \frac{k_{\varsigma_1,\varsigma_2}\left(xy; \frac{\pi}{2\varsigma}\right)}{x} f^{(-)}(x)dx +$$

$$+ e^{i\frac{\pi}{2}(1-\mu)} \frac{d}{dy}\int_0^\infty \frac{k_{\varsigma_1,\varsigma_2}\left(xy; -\frac{\pi}{2\varsigma}\right)}{x} f^{(+)}(x)dx$$

holds also almost everywhere on $(0, +\infty)$. There exist constants $M_1 > 0$, $M_2 > 0$ independent of the functions so that there holds

$$\int_0^\infty \left|f^{(\pm)}(x)\right|^2 dx \leq M_1 \int_0^\infty |g(y)|^2\, y^{2(\mu-1)}dy \quad \text{and}$$

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(3.6) $$\int_0^\infty |g(y)|^2 \, y^{2(\mu-1)} dy \leqslant M_2 \left\{ \int_0^\infty |f^{(+)}(x)|^2 \, dx + \int_0^\infty |f^{(-)}(x)|^2 \, dx \right\}$$

Theorem 2: For every $f(x) \in L_2(0, +\infty)$

(3.7) $$g^{(\pm)}(y) y^{\mu-1} = \frac{d}{dy} \int_0^\infty \frac{k_{\varsigma_1,\varsigma_2}\left(xy; \pm \frac{\pi}{2\varsigma}\right)}{x} f(x) dx$$

defines almost everywhere on $(0, +\infty)$ the functions $g^{(\pm)}(y) y^{\mu-1} \in L_2(0, +\infty)$. The dual formula

(3.8) $$f(x) = e^{-i\frac{\pi}{2}(1-\mu)} \frac{d}{dx} \int_0^\infty \frac{h^{(-)}_{\varsigma_1,\varsigma_2}(xy)}{y} g^{(+)}(y) y^{\mu-1} \, dy \; +$$

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$$+ e^{i\frac{\pi}{2}(1-\mu)} \frac{d}{dx} \int_0^\infty \frac{h^{(+)}_{\varsigma_1,\varsigma_2}(xy)}{y} g^{(-)}(y) y^{\mu-1}\, dy$$

holds also almost everywhere on $(0, +\infty)$. There exist constants $K_1 > 0$, $K_2 > 0$ independent of functions so that it holds

$$\int_0^\infty | g^{(\pm)}(y)|^2 y^{2(\mu-1)}\, dy \leq K_1 \int_0^\infty |f(x)|^2\, dx$$

and

$$(3.9) \quad \int_0^\infty |f(x)|^2\, dx \leq K_2 \left\{ \int_0^\infty |g^{(+)}(y)|^{2(\mu-1)} dy + \int_0^\infty |g^{(-)}(y)|^2 y^{2(\mu-1)} dy \right\}.$$

Theorem 3:
If $g_1(x)$ is a function of the class

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(3.12) $$h_{1,1}(x) = -4 \cos \pi\mu_2 \int_0^x J_{\mu_1-\mu_2}(2t)\sqrt{t}\,dt -$$

$$- 4 \sin \pi\mu_2 \int_0^x Y_{\mu_1-\mu_2}(2t)\sqrt{t}\,dt ,$$

then

(3.13) $$K_\nu(ze^{\pm i \frac{\pi}{2}}) = \mp \frac{\pi i}{2} e^{\mp i \frac{\pi\nu}{2}} \left[J_\nu(z) \mp iY_\nu(z)\right]$$

belong to the class $L_2(0, +\infty)$. The entire functions of the order $\leq \varrho$ and of finite type defined by

(3.14) $$G_\sigma(z) = e^{-i\frac{\pi}{2}(1-\mu)} \frac{1}{\sqrt{2\varrho}} \int_0^\sigma \phi_{\varrho_1,\varrho_2}(x^{\frac{1}{\varrho}} ze^{i\frac{\pi}{2\varrho}}; \mu_1, \mu_2)x^{\mu-1}f^{(-)}(x)dx+$$

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$$+ e^{i\frac{\pi}{2}(1-\mu)} \frac{1}{\sqrt{2\varsigma}} \int_0^{\sigma} \phi_{\varsigma_1,\varsigma_2}(x^{\frac{1}{\varsigma}} z e^{-i\frac{\pi}{2\varsigma}}; \mu_1,\mu_2)\, x^{\mu-1} f^{(+)}(x)dx \quad (\sigma > 0)$$

converge for $\sigma \to +\infty$ in the mean to $g_1(y)$ in the sense of

$$(3.15) \quad \lim_{\sigma\to+\infty} \int_0^{\infty} |g_1(y) - G_{\sigma}(y)|^2\, y^{2\mu\varsigma-\varsigma-1} dy = 0$$

For $\varsigma \geqslant 1$ it holds

$$(3.16) \quad \lim_{\sigma\to+\infty} \int_0^{\infty} |G_{\sigma}(ye^{i\varphi})|^2\, y^{2\mu\varsigma-\varsigma-1} dy = 0 \quad \frac{\pi}{\varsigma} \leq \varphi \leq 2\pi - \frac{\pi}{\varsigma}$$

Theorem 4 is a generalization of the Hanckel - transformation.

The author thanks S.A. Akopyan, young scientific co-worker for calculations.

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There are 7 references: 4 Soviet and 3 English

Association: Yerevanskiy gosudarstvennyy universitet, Institut matematiki i mekhaniki AN Armyanskoy SSR (Yerevan State University, Institute of Mathematics and Mechanics of the Academy of Sciences Armyanskaya SSR)

SUBMITTED: December 26, 1959

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S/038/60/024/03/06/008

AUTHOR: Dzhrbashyan, M.M. 16

TITLE: Integral Transformations With Volterra Kernels

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya matematicheskaya, 1960, Vol. 24, No. 3, pp. 387-420

TEXT: The paper contains a detailed representation of the results announced in (Ref. 1) on several integral representations and on the asymptotic properties of the Volterra function

$$\nu(z\,;\mu) = \int_0^\infty \left\{ \Gamma(1+\mu+t) \right\}^{-1} z^{\mu+t}\, dt$$ on the Riemann surface

$-\infty < \arg z < +\infty$.

There are 10 lemmata and 4 theorems.

There are 9 references: 3 Soviet, 1 Italian, 1 French, 1 German, 1 English and 2 American.

ASSOCIATION: Institut matematiki i mekhaniki AN Armyanskoy SSR (Institute of Mathematics and Mechanics AS Arm.SSR)

PRESENTED: by I.N. Vekua, Academician

SUBMITTED: May 25, 1959

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16.3400 16.4100 S/020/60/132/04/04/064

AUTHORS: Dzhrbashyan, M.M., Academician AS Arm SSR and Nersesyan, A.B. 16

TITLE: Expansion in Special Biorthogonal Systems and Boundary Value Problems for Fractional-Order Differential Equations 16

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 132, No. 4, pp. 747-750

TEXT: The authors investigate special systems biorthogonal on the interval [0,1] which are formed by linear combinations of functions of the Mittag-Leffler type

$$(1) \qquad E_{\rho}(z;\mu) = \sum_{k=0}^{\infty} \frac{z^k}{\Gamma(\mu+k\rho^{-1})} \quad (\mu>0,\ \rho\geqslant\frac{1}{2}).$$

It is stated that the expansions in terms of these functions converge simultaneously with the ordinary Fourier series. On a finite interval the authors formulate conjugated boundary value problems for differential equations of fractional order $\frac{1}{\rho}$ $(\rho\geqslant\frac{1}{2})$, the adjoined and eigenfunctions of which for special parameter values agree with the considered biorthogonal

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Expansion in Special Biorthogonal Systems and Boundary Value Problems for Fractional-Order Differential Equations S/020/60/132/04/04/064

systems. The results are discrete analogies of the theory of singular integral transformations developed by Dzhrbashyan (Ref. 1). There is 1 Soviet reference.

ASSOCIATION: Institut matematiki i mekhaniki Akademii nauk Arm SSR (Institute of Mathematics and Mechanics AS Arm SSR) Yerevanskiy gosudarstvennyy universitet (Yerevan State University).

SUBMITTED: February 9, 1960

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S/020/60/132/05/06/069

AUTHORS: Dzhrbashyan, M. M. Academician of the Academy of Sciences Armenian SSR, Martirosyan, R. M.

TITLE: On the General Theory of Biorthogonal Kernels 16

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 132, No. 5, pp. 994-997

TEXT: The paper is a continuation of (Ref. 1). There was proved the existence of certain biorthogonal kernels $\widetilde{K}(\xi, x)$, $\widetilde{K}_*(\xi, x)$ in the Hilbert space $H_k = L^2_{\sigma_k}(a_k, b_k)$ of all functions which are σ_k - measurable and summable in the square on (a_k, b_k). Now $K(\xi, x)$ is called complete in H_1, if from $f(x) \in H_1$ and

$$\int_{a_1}^{b_1} K(\xi, x)\, \overline{f(x)}\, d\sigma_1(x) = 0$$

for all $\xi \in (a_2, b_2)$ it follows that $f(x) \equiv 0$. Every complete kernel is called kernel of an isometric operator, if for all $\xi, \eta \in (a_2, b_2)$ the condition

$$(6) \qquad \int_{a_1}^{b_1} \overline{K(\xi, x)}\, K(\eta, x)\, d\sigma_1(x) = \int_{a_2}^{b_2} e_\xi(x) e_\eta(x)\, d\sigma_2(x) \qquad \text{for all } \xi, \eta \in (a_2, b_2)$$

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On the General Theory of Biorthogonal Kernels

is satisfied, where

$$(4)\quad e_\xi(x) = \begin{cases} 1, & x \in [0,\xi) \\ 0, & x \bar{\in} [0,\xi) \end{cases} \quad \xi > 0, \quad e_\xi(x) = \begin{cases} -1, & x \in [\xi,0) \\ 0, & x \bar{\in} [\xi,0) \end{cases}, \quad \xi < 0$$

The function $\widetilde{K}(\xi,x)$, $\xi \in (a_2,b_2)$, $x \in (a_1,b_1)$ is called B-kernel, if there is a $\widetilde{K}_*(\xi,x)$ such that

$$(1)\quad \widetilde{K}(\xi,x) \in H_1, \quad \widetilde{K}_*(\xi,x) \in H_1,$$

$$(5)\quad \int_{a_1}^{b_1} \overline{\widetilde{K}(\xi,x)}\, \widetilde{K}_*(\eta,x)\, d\sigma_1(x) = \int_{a_2}^{b_2} e_\xi(x)\, e_\eta(x)\, d\sigma_2(x)$$

and furthermore that $\widetilde{K}$ and $\widetilde{K}_*$ are complete. $\widetilde{K}$ and $\widetilde{K}_*$ are called conjugate kernels. A B-kernel $\widetilde{K}(\xi,x)$ is called a Bessel kernel, if to every $f(x) \in H_1$ there corresponds a $g(\xi) \in H_2$ so that for all

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$\eta \in (a_2, b_2)$ it holds

(7) $$\int_{a_1}^{b_1} f(x)\,\overline{\tilde{K}_*(\eta, x)}\,d\sigma_1(x) = \int_{a_2}^{b_2} g(\xi)\,e_\eta(\xi)\,d\sigma_2(\xi).$$

A B-kernel $\tilde{K}_*(\xi, x)$ is called a Hilbert kernel, if to every $g(\xi) \in H_2$ there corresponds an $f(x) \in H_1$ so that

(9) $$\int_{a_1}^{b_1} f(x)\,\overline{\tilde{K}(\eta, x)}\,d\sigma_1(x) = \int_{a_2}^{b_2} g(\xi)\,e_\eta(\xi)\,d\sigma_2(\xi)$$

A B-kernel which is simultaneously Bessel and Hilbert kernel is called a Riesz-Fischer kernel.

In 10 theorems the author gives several statements on the introduced kernels, e. g.

Theorem 5: If a B-kernel is a Bessel kernel, then the conjugate kernel is a Hilbert kernel.

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Theorem 6: In order that a B-kernel $\tilde{K}(\xi, x)$ be a Bessel kernel, it is necessary and sufficient that there exists a positive bounded Hermitean operator T(defined on H_1) such that for all $\xi \in (a_2, b_2)$ it holds

(11) $$\tilde{K}_{*}(\xi, x) = T\,\tilde{K}(\xi, x) .$$

N. K. Bari is mentioned in the paper.
There are 5 references: 3 Soviet, 1 Hungarian and 1 American.

ASSOCIATION: Institut matematiki i mekhaniki Akademii nauk Arm SSR (Institute of Mathematics and Mechanics AS Armenian SSR)

SUBMITTED: February 25, 1960

Card 4/4

81388

S/020/60/132/06/07/068
C111/C222

AUTHOR: Dzhrbashyan, M.M., Academician AS Arm SSR, and Martirosyan, R.M.

TITLE: The Problem of Moments and the Biorthogonalization of Kernels

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 132, No. 6, pp. 1250-1253

TEXT: The paper is a continuation of (Ref. 1) and (Ref. 2). The authors investigate the general continuable momentum problem. The results are used in order to biorthogonalize the so-called C-kernels. $K(\xi,x)$, $\xi \in (a_2,b_2)$ and $x \in (a_1,b_1)$, is called a C-kernel if for all $\xi \in (a_2,b_2)$ it holds $\tilde{K}(\xi,x) \in H_1$, where $H_1 = L^2_{\sigma_1}(a_1,b_1)$ is the Hilbert space of all σ_1-measurable functions being summable in the square on (a_1,b_1) and if in all points of continuity ξ_0 of $\sigma_2(\xi)$ it holds

$$(1)\quad \int_{a_1}^{b_1} |\tilde{K}(\xi_0+\delta,x)-\tilde{K}(\xi_0,x)|^2 d\sigma_1(x) \leq c(\xi_0)|\sigma_2(\xi_0+\delta)-\sigma_2(\xi_0)|^{\alpha(\xi_0)},$$

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The Problem of Moments and the Biorthogonalization of Kernels

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C111/C222

where $c(\xi_o)$ and $\alpha(\xi_o)$ are constants and $\sigma_1(x)$, $\sigma_2(x)$ are non-decreasing functions on (a_1, b_1) and (a_2, b_2) respectively, with a bounded variation on arbitrary $[\alpha, \beta] \subset (a_k, b_k)$, $k = 1,2$. Furthermore it is investigated when a kernel $K(\xi, x)$ "neighboring quadratically" to a Riesz-kernel (compare (Ref. 2)) is a Riesz-kernel itself. There are four theorems. There are 3 references: 2 Soviet and 1 American.

ASSOCIATION: Institut matematiki i mekhaniki Akademii nauk Arm SSR (Institute of Mathematics and Mechanics AS Arm SSR)

SUBMITTED: February 25, 1960

Card 2/2

30827
S/038/61/025/006/002/004
B112/B108

16.4400 16.4600

AUTHORS: Dzhrbashyan, M. M., and Martirosyan, R. M.

TITLE: Theory of the general kernel transformations

PERIODICAL: Akadimiya nauk SSSR. Izvestiya seriya Matematicheskaya, v. 25, no. 6, 1961, 825 - 870

TEXT: A general theory of the linear transformations of Hilbert-space functions $L^2_{\sigma_1}(a_1, b_1)$ into $L^2_{\sigma_2}(a_2, b_2)$ is developed. The indices σ_k refer to the weight functions $\sigma_k(x)$ that occur in the scalar products

$$(f_1, f_2)_{\sigma_k} = \int_{a_k}^{b_k} f_1(x)\overline{f_2(x)}d\sigma_k(x)$$

of $H_k = L^2_{\sigma_k}(a_k, b_k)$ $(k = 1,2)$. In particular, the linear (almost) iso-

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Theory of the general kernel transformations B112/B108

metric mappings of H_1 onto H_2 are investigated. The theorems derived concern the following types of kernels: Bessel kernels $\widetilde{K}$:

$$\int_{a_1}^{b_1} \widetilde{K}(\xi,x)\widetilde{K}_*(\eta,x)d\sigma_1(x) = \int_{a_2}^{b_2} e_\xi(u)e_\eta(u)d\sigma_2(u), \qquad (1.6)$$

$$\int_{a_1}^{b_1} f(x)\overline{\widetilde{K}_*(\eta,x)}d\sigma_1(x) = \int_{a_2}^{b_2} g(u)e_\eta(u)d\sigma_2(u), \qquad (1.7)$$

where $\widetilde{K}_*$ is biorthogonally conjugate to $\widetilde{K}$,

$$e_\xi(x) = \begin{cases} 1, & x \in [0,\xi), \\ 0, & x \overline{\in} [0,\xi) \end{cases} \qquad \xi > 0,$$

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$(f \to g)$. The relationship of such kernels with the kernels of isometric mappings is investigated. Necessary and sufficient conditions for the solvability of the general problem of moments in the spaces H_1 and H_2 are derived. The results obtained are generalisations of the well known results of N. K. Bari, which concern the kernels of biorthogonal transformations (Doklady Ak. nauk SSSR, 54 (1946), 383 - 386., Uch. zap. MGU, vyp. 148, t. IV (1951), 69 - 107., Doklady Ak. nauk SSSR, 33 (1941) 342 - 345.). There are 11 references: 8 Soviet and 3 non-Soviet. The two references to English-language publications read as follows: Paley R. and Wiener N., Fourier transforms in the complex domain. New York, 1934.; Fox C., A composition theorem for General Unitary Transforms. Proc. Amer. Math. Soc., 8 (1957), 880 - 883.

ASSOCIATION: Institut matematiki i mekhaniki Ak. nauk Armyanskoy SSR (Institute of Mathematics and Mechanics of the Academy of Sciences Armyanskaya SSR)

SUBMITTED: June 16, 1961

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16.4600

S/020/61/141/002/003/027
C111/C444

AUTHOR: Dzhrbashyan, M. M., Member of the Academy of Sciences, Arm SSR

TITLE: Unitary pairs of operators and their analytic characteristic in the $L_2(a,b)$ space

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 141, no. 2, 1961, 281-284

TEXT: The notion of the unitary pair of operators is introduced and for this case the theorem of Bochner (Ref. 1: S. Bochner, K. Chandrasekharan, Fourier Transforms, Princeton, 1949, p. 150-156) on the analytic characteristic of unitary operators in $L_2(a,b)$ is generalized.

Let U_1 and U_2 be two linear bounded operators in the abstract Hilbert-space H with the range $\Delta_k = U_k H \subseteq H$ $(k = 1,2)$. Let U_1^* and U_2^* be the adjoint operators. The ordered pair of operators $\{U_1, U_2\}$ is called unitary, if for arbitrary $f \in H$, $g \in H$

$$(U_1^* f, U_1^* g) = (f,g); \qquad (1)$$

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Unitary pairs of operators and . . . S/020/61/141/002/003/027
C111/C444

$$(U_1f, U_1g) + (U_2f, U_2g) = (f,g) \qquad (2)$$

(f,g) being the scalar product, generating the metric of H. The class of all those unitary pairs is called $\mathfrak{A}(H)$.

From the definition general properties are concluded:

A. In order a linear bounded operator U_1, given in H, to be unitary, it is necessary and sufficient that from $\{U_1, U_2\} \in \mathfrak{A}(H)$ follows $U_2 = 0$, 0 being the operator transforming all elements of H to zero.

B. If $\{U_1, U_2\} \in \mathfrak{A}(H)$, then the operators

$$P_1 = U_1^* U_1, \quad P_2 = U_2^* U_2 \qquad (3)$$

project the space H on subspaces H_1 and H_2 which are orthogonal complements of each other.

C. If $\{U_1, U_2\} \in \mathfrak{A}(H)$, then for arbitrary f and g of $\Delta_2 = U_2H$ there holds

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$$(U^*_2 f, U^*_2 g) = (f, g) \qquad (5)$$

D. If a linear bounded operator U_1 satisfies the condition (1), then there exists a linear bounded operator U_2 (unique among positive self-adjoint operators) such that $\{U_1, U_2\} \in \mathfrak{A}\ (H)$.

The function e_ξ be defined by

$$e_\xi(x) = \begin{cases} 1, & x \in [0, \xi), \\ 0, & x \bar{\in} [0, \xi), \end{cases} \quad \xi > 0; \quad e_\xi(x) = \begin{cases} -1, & x \in [\xi, 0), \\ 0, & x \bar{\in} [\xi, 0). \end{cases} \quad \xi < 0. \qquad (6)$$

Let x be an inner or boundary point of (a,b).

Theorem 1: To every pair $\{U_1, U_2\} \in \mathfrak{A}\ (H)$, $H = L_2(a,b)$ there correspond four functions:

$$K(\xi, x) = U_1 e_\xi(x), \quad K^*(\xi, x) = U_1^* e_\xi(x)$$
$$R(\xi, x) = U_2 e_\xi(x), \quad R^*(\xi, x) = U_2^* e_\xi(x) \qquad (7)$$

belonging to $L_2'(a,b)$ for every $\xi \in (a,b)$ and possessing the following property:

The correspondence

$$g_1 = U_1 f, \quad g_2 = U_2 f, \quad f = U_1^* g_1 + U_2^* g_2, \quad f \in H \qquad (8)$$

is realised by the formulas

$$\int_a^{\xi} g_1(x)\,dx = \int_a^b \overline{K^*(\xi, x)}\, f(x)\,dx, \quad \int_a^{\xi} g_2(x)\,dx = \int_a^b \overline{R^*(\xi, x)}\, f(x)\,dx, \qquad (9)$$

$$\int_a^{\xi} f(x)\,dx = \int_a^b \overline{K(\xi, x)}\, g_1(x)\,dx + \int_a^b \overline{R(\xi, x)}\, g_2(x)\,dx, \qquad (10)$$

and the correspondence

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$$g = U_1^* f, \quad f = U_1 g, \quad f \in H, \tag{11}$$

is realised by the formulas

$$\int_0^{\xi} g(x)dx = \int_a^b \overline{K(\xi,x)}\, f(x)\, dx, \quad \int_0^{\xi} f(x)dx = \int_a^b \overline{K^*(\xi,x)}\, g(x)\, dx\,. \tag{12}$$

Besides the functions (7) satisfy the following equations

$$\left.\begin{array}{l} a)\ \int_a^b \overline{K(\xi,x)}\, K(\eta,x)dx + \int_a^b \overline{R(\xi,x)}\, R(\eta,x)\, dx \\ b)\ \int_a^b \overline{K^*(\xi,x)}\, K^*(\eta,x)\, dx \end{array}\right\} =$$

X

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$$= \int_a^b e_{\xi}(x)\, e_{\eta}(x)dx = \begin{cases} \min(|\xi|, |\eta|) & \text{for } \xi\eta \geq 0, \\ 0 & \text{for } \xi\eta \leq 0; \end{cases}$$

c) $$\int_0^{\eta} K(\xi, x)\, dx = \int_0^{\xi} \overline{K^*(\eta, x)}\, dx;$$

d) $$\int_0^{\eta} R(\xi, x)\, dx = \int_0^{\xi} \overline{R^*(\eta, x)}\, dx$$

The converse: each system of four functions

$K(\xi, x)$, $K^*(\xi, x)$; $R(\xi, x)$, $R^*(\xi, x)$

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which satisfies a), b), c), d), according to (9) - (10), (12) generates a certain unitary pair $\{U_1, U_2\}$ which is connected with these functions by (7).

Some conclusions of the theorem and the property D are given.

There are 2 Soviet-bloc and 2 non-Soviet-bloc references. The reference to English-language publication reads as follows: S. Bochner, K. Chandrasekharan, Fourier Transforms, Princeton, 1949, p.150-156.

ASSOCIATION: Institut matematiki i mekhaniki Akademii nauk Arm SSR (Institute of Mathematics and Mechanics of the Academy of Sciences Armyanskaya SSR)

SUBMITTED: August 21, 1961

DZHRBASHYAN, M.M., akademik

Cc lation and closure of an incomplete system of functions $\left\{e^{-\mu_k x} x^{s_k-1}\right\}$. Dokl. AN SSSR 141 no.3:539-542 N '61. (MIRA 14:11)

1. AN Armyanskoy SSR i Institut matematiki i mekhaniki AN Armyanskoy SSR.

(Functional analysis)

DZHRBASHYAN, M. M.

"Investigation of some incomplete systems in a complex region"

report submitted at the Intl Conf of Mathematics, Stockholm, Sweden, 15-22 Aug 62

DZHRBASHYAN, M.M., akademik

Integral representation of certain orthogonal systems. Dokl.AN Arm.SSR 35 no.1:13-19 '62. (MIRA 15:8)

1. Institut matematiki i mekhaniki AN Armyanskoy SSR.
(Functions, Orthogonal)

DZHRBASHYAN, M.M., akademik

Completion of an incomplete system. Dokl. AN Arm. SSR 35 no.3: 97-105 '62. (MIRA 16:6)

1. Institut matematiki i mekhaniki Akademii nauk Armyanskoy SSR.
(Functions)

16.3000

S/020/62/143/001/002/030
B112/B102

AUTHOR: Dzhrbashyan, M. M., Member of the AS ArmSSR

TITLE: Expansion with respect to systems of rational functions with fixed poles

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 143, no. 1, 1962, 17 - 20

TEXT: The author considers expansions

$$f(z) = \sum_{k=0}^{\infty} c_k M_k^{(s)}(z), \qquad z \in G^{(+)}.$$

The system of the rational functions $M_k^{(s)}(z)$ is introduced in the following way: Let $w = \Phi(z)$ be a conformal mapping of the region $G^{(-)}$ (which is complementary to the simply connected region $G^{(+)}$) into the region $|w|>1$, and let $\{\alpha_k\} \subset G^{(-)}$ be an arbitrary sequence of complex numbers. The Malmquist system

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$$\varphi_0(w) = \frac{(1-|\alpha_0|^2)^{1/2}}{1-\bar{\alpha}_0 w},$$

$$\varphi_n(w) = \frac{(1-|\alpha_n|^2)^{1/2}}{1-\bar{\alpha}_n w} \prod_{k=0}^{n-1} \frac{\alpha_k - w}{1-\bar{\alpha}_k w} \frac{|\alpha_k|}{\alpha_k} \quad (n = 1, 2, \ldots), \tag{4}$$

where $\alpha_k = \left[\overline{\Phi(\omega_k)}\right]^{-1}$, is orthonormal on the unit circle $|w| = 1$. For each ϱ with $1 < \varrho < R_n = \min\limits_{0 \leqslant k \leqslant n} \left\{|\Phi(\omega_k)|\right\}$, there is a curve $|\Phi(z)| = \varrho$ (designated by Γ_ϱ) which separates the region $G_\varrho^{(-)}$ from the region $G_\varrho^{(+)}$. The functions

$$M_k^{(s)}(z) = \frac{1}{2\pi i} \int_{\Gamma_\rho} \frac{\varphi_k[\Phi(\xi)]\,[\Phi'(\xi)]^s}{\xi - z}\, d\xi \quad (k = 0, 1, \ldots, n). \tag{5}$$

are defined for $z \in G_\varrho^{(+)}$, and

$$M_k^{(s)}(z) = \varphi_k[\Phi(z)]\,[\Phi'(z)]^s + \frac{1}{2\pi i} \int_{\Gamma_\rho} \frac{\varphi_k[\Phi(\xi)]\,[\Phi'(\xi)]^s}{\xi - z}\, d\xi \quad (k = 0, 1, \ldots, n). \tag{6}$$

for $z \in G_\varrho^{(-)}$. There are 3 references: 2 Soviet and 1 non-Soviet. The reference to the English-language publication reads as follows:
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Expansion with respect to...

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B112/B102

J. L. Walsh, Interpolation and Approximation, N. Y., 1935, pp. 305 - 309.

ASSOCIATION: Institut matematiki i mekhaniki Akademii nauk ArmSSR (Institute of Mathematics and Mechanics of the Academy of Sciences of the Armyanskaya SSR)

SUBMITTED: December 6, 1961

Card 3/3

DZHRBASHYAN, M. M., akademik

Orthogonal systems of rational functions on a circle with a given set of poles. Dokl. AN SSSR 147 no.6:1278-1281 D '62. (MIRA 16:1)

1. AN Armyanskoy SSR i Institut matematiki i mekhaniki AN Armyanskoy SSR.

(Sequences(Mathematics)) (Functions, Modular)

DZHRBASHYAN, M.M.

On two papers by G.V.Badalian. Izv. AN Arm. SSR. Ser. fiz.-mat. nauk 16 no.1:129-130 '63. (MIRA 1[illegible]3)
(Bernstein polynomials)

DZHRBASHYAN, M.M., akademik; AKOPYAN, S.A.

Theory of integral transformations with Mittag-Leffler kernels.
Dokl. AN Arm. SSR 38 no.4:207-216 '64. (MIRA 17:6)

1. Institut matematiki i mekhaniki AN Armyanskoy SSR.
2. AN Armyanskoy SSR (for Dzhrbashyan).

DZHRBASHYAN, M.M., akademik; KITBALYAN, A.A.

Generalization of Chebyshev polynomials. Dokl. AN Arm. SSR 38 no.5:263-270 '64. (MIRA 17:6)

1. Institut matematiki i mekhaniki AN Armyanskoy SSR. 2. AN Armyanskoy SSR (for Dzhrbashyan).

DZHRBASHYAN, M.M., akademik

Parametric representation of certain general classes of functions meromorphic in a unit circle. Dokl. AN SSSR 157 no.5:1024-1027 Ag '64. (MIRA 17:9)

1. An ArmSSR i Institut matematiki i mekhaniki AN ArmSSR.

Academician AN

integral function, analytic function

where $\mu = (1 + \omega + \rho)/2\rho$ and $\varphi_k(v) \in L_1(0, \sigma_k)$ $(k = 0, 1, \ldots, 2r - 1)$.

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formulas.

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NR REF SOV: 004 OTHER: 002 JPRS

Card 3/3

DZHRBASHYAN, M.M.

Estimation of holomorphic functions subject to additional conditions in a unitary circle. Usp. mat. nauk 20 no.4:148-150 Jl-Ag '65. (MIRA 18:8)

L 56047-65 EWT(d) IJP(c)

...yan, ... M. (Academician AN Arm...)

...al transformations in a ...mplex ...

AN SSSR. Doklady, v. 159, ...

...: integral transform, mathematic operator

...: The author constructs Fourier-Plancherel and Paley-Wiener operators for ... consisting of a finite ... formulas.

...: Institut matematiki i mekhaniki Akademii nauk ... (Institute of ... and Mechanics Academy of Sciences ...)

SUBMITTED: 17Aug64 ENCL: 00 SUB CODE: MA

... OTHER: ...

Card 1/1

APPROVED FOR RELEASE: 03/13/2001 CIA-RDP86-00513R000411910019-5"

L 29099-66 EWT(d)/T IJP(c)

ACC NR: AP6019386 SOURCE CODE: UR/0042/65/020/004/0148/0150

AUTHOR: Dzhrbashyan, M. M.

20

B

ORG: none

TITLE: Evaluation of holomorphic functions subject to additional conditions in a unit circle

SOURCE: Uspekhi matematicheskikh nauk, v. 20, no. 4, 1965, 148-150

TOPIC TAGS: function, mathematics

ABSTRACT: It is assumed that in the unit circle $|z|<1$ there are given the points $(0<|\alpha_k|<1)$, which differ from one another. Designated by $B_1(\alpha_1, \ldots, \alpha_n)$ is a class of functions $f(z)$ which are holomorphic in the circle $|z|<1$ and satisfy the conditions

$$|f(z)|<1, \quad |z|<1,$$

$$|f(\alpha_k)|<\varepsilon_k \quad (k=1, 2, \ldots, n),$$

where $\{\varepsilon_k\}_1^n$ $(0\leq\varepsilon_k\leq 1)$ are given numbers. The article considers the following theorem of S. Ya. KHAVINSON: If

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UDC: 517.5

L 29099-66

ACC NR: AP6019386

$f(z) \in B_1(\alpha_1, \ldots, \alpha_n)$, then given any z, $|z| < 1$, there occurs the inequality

$$|f(z)| < |B_n(z)| \left\{ 1 + \sum_{k=1}^{n} \varepsilon_k \left(1 - \left| \frac{z-\alpha_k}{1-\bar{\alpha}_k z} \right|^2 \right) \left| \frac{1-\bar{\alpha}_k z}{z-\alpha_k} \right| \prod_{\substack{\nu=1 \\ \nu \neq k}}^{n} \left| \frac{1-\alpha_\nu \bar{\alpha}_k}{\alpha_\nu - \alpha_k} \right| \right\},$$

where

$$B_n(z) = \prod_{\nu=1}^{n} \frac{z-\alpha_\nu}{1-\bar{\alpha}_\nu z}.$$

KHAVINSON proved this theorem by means of results on duality in extremum problems with additional conditions within a domain, as well as by using solutions to certain extremum problems in a circle. The author suggests that the last-mentioned inequality, as well as other more general inequalities in the class generally speaking of unbounded functions, can be established more simply and directly by using interpolation formulas. Orig. art. has: 14 formulas. [JPRS]

SUB CODE: 12 / SUBM DATE: 16Sep63 / ORIG REF: 003

Card 2/2

L 44014-66 EWT(d)/ IJP(c)
ACC NR: AP6032104 SOURCE CODE: UR/0429/66/001/001/0003/0024

AUTHOR: Dzhrbashyan, M. M. (Professor)

ORG: Institute of Mathematics and Mechanics, AN ArmSSR (Institut matematiki i mechaniki AN ArmSSR)

32
B

TITLE: Orthogonal systems of rational functions on the unit circle

SOURCE: AN ArmSSR. Izvestiya. Matematika, v. 1, no. 1, 1966, 3-24

TOPIC TAGS: orthogonal function, mathematics

ABSTRACT: This paper deals with the algebraic properties of systems of rational functions which are orthonormal on the unit circle with respect to the weight $(2\ )^{-1}$ d (x) and whose poles lie on a given sequence of points situated outside the unit circle. In the case in which all the poles of the system under consideration coincide with the point at infinity, the theorems proved here concur with the well-known assertions of the theory of orthogonal (with respect to the weight function) polynomials developed by Szego ("Orthogonal Polynomials", Chpts. X and XI, M., 1962; "Toeplitz Forms and Their Application", Chpts. 2 and 3, M, 1961). Orig. art. has: 2 formulas. [JPRS: 36,712]

SUB CODE: 12 / SUBM DATE: 30Dec65 / ORIG REF: 005 / OTH REF: 003

Card 1/1 ZC

L 09107-67 EWT(d) IJP(c)

ACC NR: AP7002358 SOURCE CODE: UR/0429/66/001/002/0106/0125

DZHRBASHYAN, M. M. (Institute of Mahtematics and Machanics, AN ArmSSR (Institut matematiki i mekhaniki AN ArmSSR) 16

"Orthogonal Systems of Rational Functions on a Circle"

Yerevan; Izvestiya Akademii Nauk Armyanskoy SSR; Matematika.; Vol. 1, No. 2, 1966; pp. 106-125

ABSTRACT: This paper reveals the algebraic properties of sets of rational functions which are orthonormal on the unit circle with respect to the weight $(2\pi)^{-1}d\omega(x)$ and whose poles lie on a given sequence of points situated outside the unit circle.

In the case when all the poles of the set under considerations coincide with the point at infinity, the theorems proved have concur with the well-known assertions of the theory of orthogonal (with respect to the weight function) polynomials developed by Szegö. Orig. art. has: 2 formulas [JPRS: 38,006]

TOPIC TAGS: polynomial, function

SUB CODE: 12 / SUBM DATE: 30Dec65

Card 1/1 nat

ACC NR: AP7004542 SOURCE CODE: UR/0038/66/030/004/0825/0852

AUTHOR: Dzhrbashyan, M. M.; Akopyan, S. A.

ORG: Institute of Mathematics and Mechanics, AN ArmSSR (Institut matematiki i mekhaniki AN ArmSSR)

TITLE: Classes of functions and integral transformations associated with them in a complex space

SOURCE: AN SSSR. Izvestiya. Seriya matematicheskaya, v. 30, no. 4, 1966, 825-852

TOPIC TAGS: analytic function, mathematic operator

ABSTRACT: The author establishes the parametric representation of a class $\mathcal{H}_2[\alpha]$ of functions which are analytical in the region of an arbitrary angle

$$\Delta(\alpha): \left\{ |\operatorname{Arg} z| < \frac{\pi}{2\alpha},\quad 0 < |z| < \infty \right\} \quad (0 < \alpha < \infty,$$

lying on the Riemann surface of a logarithmic function.
This representation makes it possible to construct a system of Fourier-Plancherel and Wiener-Paley type operators for sets consisting of any finite number of parallel lines and bands. Orig. art. has: 2 formulas. [JPRS: 38,695]

SUB CODE: 12 / SUBM DATE: 04Mar65 / ORIG REF: 006

UDC: 517.5

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0926 1368

DZHRBASHYAN, R.T.

Spheriolite lavas in the vicinity of Gamzachiman. Izv.AN SSSR. Ser.geol. 26 no.11:105-110 N '61. (MIRA 14:10)

1. Institut geologicheskikh nauk AN Armyanskoy SSR, Yerevan.
(Bazumskiy Range--Lava)

DZHRBASHYAN, R.T.; MALKHASYAN, E.G.; MNATSAKANYAN, A.Kh.

Characteristics of the distribution of trace elements in paleovolcanic formations of the Armenian S.S.R. Izv.AN Arm. SSR. Geol.i geog.nauki 16 no.3:15-28 '63. (MIRA 17:2)

1. Institut geologicheskikh nauk AN Armyanskoy SSR.

DZHRBASHYAN, R.T.

Relation of volcanism to transverse upheavals. Dokl. AN Arm. SSR 38 no.3:175-180 '64. (MIRA 17:6)

1. Institut geologicheskikh nauk AN Armyanskoy SSR. Predstavleno akademikom AN Armyanskoy SSR S.S.Mkrtchyanom.

DZHERBASHYAN, V A

AUTHOR: DŽRBAŠJAN, V.A. PA - 2010

TITLE: The $\gamma - \gamma$ - Vortex Correlation in the Case of Meson Transitions.

PERIODOCAL: Zhurnal Eksperimental'noi i Teoret. Fiziki, 1956, Vol 31, Nr 6, pp 1090-1092 (U.S.S.R.)
Received: 1 / 1957 Reviewed: 3 / 1957

ABSTRACT: PODGORECKIJ, M.I. (Zhurn. eksp. i teor. fis., 29, 374, 1955) drew attention to a possibility of precisely determining the spin of a myon by using data concerning the angular correction between the directions of γ - quanta which were radiated on the occasion of successive mesoatom transitions. The present report investigats this problem and suggests a method for the verification of the spin of those nuclei in the case of which the value I=0 is doubtful and was determined only as a result of theoretical and experimentally not confirmed deliberations. The formulae obtained here are also suited for the determination of the spin of any mesons. In the case of light meson atoms ($Z<15$) the probabilities of radiation transitions are small compared to the probabilities of conversion transitions. In the case of heavy mesoatoms the probability of conversion transitions can be neglected if quantum numbers are low (n,l). Here an expression for the correlation function $W(\delta)$, which is suited for not very great Z ($15 < Z < 50$) is given, it is suited for the verification of the spin of those nuclei in which the value I=0 has not been confirmed by

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PA - 2clo

The $\gamma - \gamma$ - Vortex Correlation in the Case of Mason Transitions. experiment (e.g. $_{16}S^{34}$, $_{20}Ca^{40}$, $_{34}Se^{74}$). As an example it is shown that the anisotropy A = 0,43 and 0,25 corresponds to the value I = 0 and I = 1/2 at the transitions (1/2)(D)(3/2)(1/2). In heavy mesoatoms the finity of nuclear dimensions entails the necessity of computing the correlation function on the occasion of transitions of the type $l_A(L_1)l_B(L_2)l_C$. Here l_A, l_B, l_C denote the orbital moments of the meson in the initial, intermediate, and final states. In addition to super-fine structure, also fine structure must be taken into account in this case. Its contribution is based upon the fact that, because of spin - orbit-interaction as a result of the emission of the first quantum, orientation of the orbital moment in the intermediate state changes, whilst interaction with the nucleus changes the orientation of the total angular momentum J. An expression for the correlation function for heavy mesoatoms (confined to electric transitions) is given. Also any additional interaction can be taken in account. The normalization $\int W(\delta) d\Omega / 4\pi = 1$ applies. Next, some ideas expressed by PODGORECKIJ are critized. In conclusion the values of the anisotropy A for the radiation transition $2s \rightarrow 2p \rightarrow 1s$ for various spin values of the myon (at I = 0) are given. If it is possible to measure anisotropy with an accuracy of at least 0,08, this suffices for the determination of the spin of the myon if the spin of the nucleus is equal to zero. If, however, the spin of the meson is 1/2, this accuracy suffices for the purpose of deciding whether the spin of the nucleus (e.g. $_{74}W^{182}$,

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PA - 2010

The γ - γ - Vortex Correlation in the Case of Meson Transitions.

${}_{78}Pt^{194}$, ${}_{82}Pb^{204}$) is equal to zero.

ASSOCIATION: Physical Institute of the Academy of Science of the Armenian SSR.

PRESENTED BY:

SUBMITTED:

AVAILABLE: Library of Congress

CARD 3/3

DZHRBASHYAN, V. A., Cand Phys-Math Sci -- (diss) "Gamma-gamma angular correlation in mesoatomic transitions." Mos-Yerevan, 1957. 7 pp (Acad Sci Armenian SSR, Phys Inst), 150 copies (KL, 2-58, 111)

Distr: 4E3d

1999

DZHRBASHYAN, V.A.

USSR/Nuclear Physics - Elementary Particles. C-3

Abs Jour : Ref Zhur - Fizika, No 1, 1958, 370

Author : Dzhrbashyan, V.A.

Inst : Institute of Physics, Academy of Sciences, Armenian SSR

Title : Angular Correlation of Gamma Quanta, Emitted by Mesonic Atoms.

Orig Pub : Izv. AN ArmSSR, ser. fiz.-matem. n., 1957, 10, No 2, 81-88

Abstract : The author derives the value of the anisotropy A = W (180)/W (90) -1 for two gamma quanta, radiated by μ -mesonic atoms upon successive transitions of the meson from one level to another (W (ϑ) is the probability of successive radiation of quanta making an angle ϑ). The calculation is made for medium and heavy mesonic atoms, for which the dipole electric transitions play the principal part. Account is taken of the influence of the fine and

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DZHRBASHYAN, V. A.

56-1-54/56

AUTHOR: Dzhrbashyan, V. A.

TITLE: The Influence of the Polarization of a Negative Myon Upon the Effect of the Correlation of γ-Rays Emitted by the Meso-atom (Vliyaniye polyarizatsii μ-mezona na effekt korrelyatsii γ-luchey, izluchayemykh mezoatomom)

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1958, Vol. 34, Nr 1, pp. 260 - 260 (USSR)

ABSTRACT: It was recently experimentally determined (reference 2) that polarized negative myons are produced in the decay of negative pions. Therefore the investigation of the analogous problem at a given degree of polarization of the negative myon is of interest. The correlation function valid in the case of heavy mesoatoms for the cascade $l_A(L_1)l_B(L_2)l_C$ is explicitly given here and shortly explained. This correlation function depends on those angles which are enclosed by the axis of the rotation symmetry of the spins of the myon and the direction of emission of the first and second quantum. Moreover this correlation function is also dependent on the angle between these

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56-1-54/56

The Influence of the Polarization of a Negative Myon Upon the Effect of the Correlation of γ-Rays Emitted by the Mesoatom

two quanta. The correlation is not dependent on the degree of polarization of the negative myon, when the myon has the spin 1/2. But when the negative myon may also have the spin 3/2, the correlation function would be dependent on the degree of alignment. There are 3 references, 1 of which is Slavic.

ASSOCIATION: Physical Institute AN Armenian SSR (Fizicheskiy institut Akademii nauk Armyanskoy SSR)

SUBMITTED: November 1, 1957

AVAILABLE: Library of Congress

Card 2/2

AUTHOR: Dzhrbashyan, V. A.

SOV/56-35-1-57/59

TITLE: The Angular Correlation of Circularly Polarized γ-Quanta on a μ-Mesoatom (Uglovaya korrelyatsiya tsirkulyarno polyarizovannykh γ-kvantov na μ-mezoatome)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol. 35, Nr 1, pp. 307 - 308 (USSR)

ABSTRACT: A μ- mesoatom produced by the capture of a polarized negative myon emits circularly polarized γ-quanta. Because of the spin-orbit interaction (which causes the depolarization of the negative myon on the orbit) the angular distribution and the angular correlation of these quanta depend on the degree of polarization of the negative myon. By comparison of the theory with the experiment, data concerning the degree of polarization ($|P|$) and the direction of the polarization (sign of P) of the negative myons produced in the decay of negative pions may be obtained. The correlation function may be calculated by using a formula which was obtained in one of the author's previous papers. The explicit expression for this correlation function is given and specialized for the case that the direction of the first quantum

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The Angular Correlation of Circularly Polarized γ-Quanta on a μ-Mesoatom SOV/56-35-1-57/59

coincides with the direction of the incident negative myons. Finally, the angular distribution for the transition 2p $\rightarrow$ 1s is obtained. The author thanks V.V.Vladimirskiy for his interest in this paper and K.A.Ter-Martirosyan for his useful discussion. There are 3 references, 1 of which is Soviet.

ASSOCIATION: Fizicheskiy institut Akademii nauk Armyanskoy SSR (Physics Institute,AS Armyanskaya SSR)

SUBMITTED: April 23, 1958

Card 2/2

21(7)

AUTHOR: Dzhrbashyan, V. A. SOV/56-36-1-39/62

TITLE: The Depolarization of a μ^--Meson in Mesic Atom Transitions (Depolyarizatsiya μ^--mezona pri mezoatomnykh perekhodakh)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1958, Vol 36, Nr 1, pp 277-282 (USSR)

ABSTRACT: The author first gives a short report on earlier papers dealing with this subject, on the basis of which he investigates the depolarization of a negative muon in electric dipole-transitions. The negative muon is assumed to go over by successive emissions of Ozhe-electrons from the level l_N to the level l_1, i. e. a declining cascade $l_N(l)l_{N-1}(l)l_{N-2}(l) \dots l(l_1)$ occurs. In order to determine the corresponding density matrix, it is necessary to solve the perturbational equation in a manner suggested by Wigner (Vigner) and Weißkopf (Vayskopf), by which the finity of level-width is taken into account. However, the author describes yet another method of determining a finite result. Interaction may be inserted into the expression for the transition probability by means of an operator acting upon the wave

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function of the meson on the given level. The (rather long) expression found for the density matrix is explicitly written down and explained. Depolarization is here defined as the ratio P/P_o, where P_o and P denote the degree of polarization of the negative muon immediately before and after the investigated cascade respectively. Depolarization depends only slightly on the orbital moment of the cascade and on the types of transitions occurring in the case of large l. Thus, in transition to the level $n = 15$, $l_N = 14$ there is a cascade with $\Delta n = \Delta l = -1$, and the corresponding depolarization is 0.179. Even in the case of the first radiation transitions, radiation to the circular orbit with $\Delta n = -2$, $\Delta l = -1$ is the most probable. The influence exercised by the electron shell may be neglected in the case of mesic atom transitions, because during the life-time of the levels of mesic atoms, the negative muon is not able to depolarize in this case. An exception is formed only by the final level 1s, the life-time of which is determined by the decay of the capture of a negative muon by a nucleus. The formula derived in the present paper is suited

The Depolarization of a μ^--Meson in Mesic Atom Transitions

SOV/56-36-1-39/62

for nuclei with spin zero. Taking hyperfine structure into account leads to a greater depolarization of the negative muon. The author thanks K. A. Ter-Martirosyan for his constant interest in this work, and he also expresses his gratitude to A. I. Alikhanyan, M. L. Ter-Mikayelyan, and I. I. Gol'dman for discussing the results obtained. There are 11 references, 5 of which are Soviet.

ASSOCIATION: Fizicheskiy institut Akademii nauk Armyanskoy SSR (Physics Institute of the Academy of Sciences, Armyanskaya SSR)

SUBMITTED: July 20, 1958

Card 3/3

21(7)

AUTHOR: Dzhrbashyan, V. A. SOV/56-36-4-40/70

TITLE: Angular Distribution and Angular Correlation of Radiations of Nuclei With Orientated Electron Shells (Uglovoye raspredeleniye i uglovaya korrelyatsiya izlucheniy yader s oriyentirovannymi elektronnymi obolochkami)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 4, pp 1240-1245 (USSR)

ABSTRACT: If the life of the intermediate level is not small in comparison to the precession period of the nuclear moment in the electron shell field, interaction with the electron shell leads to a re-distribution of the m-sublevel, and a "perturbed" correlation of the nuclear radiations can be observed (cf. Ref 1). Alder developed a formula describing this effect (Ref 2) for electron shells which are in the steady state at nuclear transitions; Kester (Ref 3) investigated the deviations from Alder's formula for the case in which the conditions of the steady state are not satisfied. The author of the present paper investigates the angular correlation of two successive radiations of nuclei, both with respect to the direction and also of the polarization of the α- , β- , and γ-rays and of the

Angular Distribution and Angular Correlation of Radiations of Nuclei With Orientated Electron Shells SOV/56-36-4-40/70

conversion electrons for the case of an orientated electron shell. The correlation function used by the author deviates from that used by Goertzel (Ref 1) and Alder; with an orientation of k-th degree ($k \neq 0$) the correlation order depends essentially on the initial nuclear level. By means of the derived function the anisotropy is by way of an example investigated for the case of the known γ-γ- cascade $7/2(1,2)\, 5/2(2)\, 1/2$ in Cd^{111} with a total momentum of the electron shell $j_e = 3/2$.

One obtains: $A_{unperturbed} = -0.247$, $A_{non\text{-}orientated} = -0.103$, $A_{tot.\ orientated} = -0.149$

and for $7/2(1)\, 5/2(2)\, 1/2$ the corresponding values

-0.1034, -0.0417 and -0.1557 are obtained.

The author finally thanks K. A. Ter-Martirosyan for his interest in this work. There are 9 references, 1 of which is Soviet.

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Angular Distribution and Angular Correlation of Radiations of Nuclei With Orientated Electron Shells SOV/56-36-4-40/70

ASSOCIATION: Fizicheskiy institut Akademii nauk Armyanskoy SSR (Physics Institute of the Academy of Sciences, Armyanskaya SSR)

SUBMITTED: October 16, 1958

Card 3/3

24(5), 21(7)

SOV/56-36-5-46/76

AUTHOR: Dzhrbashyan, V. A.

TITLE: On a Possible Method of Determining the Polarization Direction of the μ^--Meson (Ob odnom vozmozhnom metode opredeleniya napravleniya polyarizatsii μ^--mezona)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 5, p 1572 (USSR)

ABSTRACT: A. Z. Dolginov (Ref 3) suggested that for the purpose of determining the direction of polarization of a μ^--meson originating from a π^--decay, the angular distribution of the circulary polarized γ- quanta be investigated which are emitted in the μ-mesoatomic transition $2p \longrightarrow 1s$. The expression for angular distribution contains the muon polarization P. In the present "Letter to the Editor" the author first gives a general expression for the angular distribution W of the circularly polarized γ-quanta for a transition $l_1 \longrightarrow l_0$ for the case in which the μ^--meson was captured into an orbit of the mesoatom with orbital momentum l_N. W is a function of l_i, P_0, τ and θ, where θ denotes the angle between the direction of emission of the γ-quantum and the direction of motion of the μ^--meson before

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On a Possible Method of Determining the Polarization Direction of the μ-Meson SOV/56-36-5-46/76

capture on the l_N-orbit (i.e. the direction of the muon beam). For the special case $l_N = 14$, $l_1 = 1$, $l_0 = 0$, W is numerically computed and the following is obtained: $W = 1 - 0.102\tau P_0 \cos\theta$. This formula gives the angular distribution of the circularly polarized γ-quanta emitted in a μ-mesoatomic transition $2p \to 1s$. (τ is a quantity which was introduced by the author in his previous papers (Refs 4-6). There are 6 references, 3 of which are Soviet.

ASSOCIATION: Fizicheskiy institut Akademii nauk Armyanskoy SSR (Physics Institute of the Academy of Sciences, Armyanskaya SSR)

SUBMITTED: December 18, 1958

Card 2/2

ARUTYUNAYAN, V.M.; VARTANYAN, Yu.L.; CHUBARYAN, E.V.; SHAKHBAZYAN, V.A.; AMATUNI, A.TS.; DZHRBASHYAN, V.A.; MELIK-BARKHUDAROV, T.K.; TEVIKYAN, R.V.; BERESTETSKIY, V.B., prof., red.; SHTIBEN, R.A., red. izd-va; KAPLANYAN, M.A., tekhn. red.

[Problems in the theory of strong and weak interactions of elementary particles; lectures] Voprosy teorii sil'nykh i slabykh vzaimodeistvii elementarnykh chastits; lektsii. Pod obshchei red. V.B.Berestetskogo. Erevan, Izd-vo Akad. nauk Armianskoi DDR, 1962. 190 p. (MIRA 15:5)

1. Akademiya nauk Armyanskoy SSR. Fizicheskiy institut.
(Nuclear reactions)

DZHUMADILOV, Sh.D.

Case of the exit of the uterus masculinus into the hernial sac in a patient with pseudothermaphroditism of the male type and transverse ectopia of the testicles. Sov.zdrav.Kir. no.2:62-64 Mr-Ap '63. (MIRA 16:5)

1. Iz khirurgicheskogo otdeleniya (zav. - K.Ye. Osadcheva) Oshskoy oblastnoy bol'nitsy (glavnyy vrach - A.A. Vdovichenko).
(GRONI--HERNIA) (HERMAPHRODITISM)

L 17973-63 EWT(m)/BDS AFFTC/ASD

ACCESSION NR: AP3000087 S/0022/63/016/002/0087/0100

AUTHOR: Dzhrbashyan, V. A.

52
51

TITLE: Dispersion formulas in the theory of nuclear excitation 19

SOURCE: AN ArmSSR. Izv. Seriya fiziko-matem. nauk, v. 16, no. 2, 1963, 87-100

TOPIC TAGS: inelastic scattering, nuclear resonance, coulomb excitation

ABSTRACT: The excitation state of nuclei under the impingement of high energy neutrons was studied. Differential excitation cross sections are considered first, using the dispersion relation for inelastic scattering in a coulomb field. This relation is derived from basic considerations in an appendix. The solution of the dispersion equation is carried out by dividing the differential cross sections into three excitation terms: coulombic excitation, interference between coulombic and nuclear resonance excitation, and pure nuclear resonance excitation. Integrating over the scattering angle, the total cross section of each excitation is obtained in the form of Legendre polynomials. The coulomb excitation term is identical with the formula given by K. Alder et al. (Sb. statey. Deformatsiya atomny*kh yader. IL, M., 1958).

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L 17973-63
ACCESSION NR: AP3000087

The nuclear resonance term gives the cross section for inelastic scattering whereas the interference term becomes significant for the high energy levels of the intermediate nuclei becoming negligible at lower levels when only the lowest values of the angular momenta are considered. The results compare favorably with existing experimental data. Orig. art. has: 67 equations and 1 figure.

ASSOCIATION: Fizicheskiy institut Yerevan (Institute of Physics, Yerevan)

SUBMITTED: 18Sep62 DATE ACQ: 12Jun63 ENCL: 00

SUB CODE: PH NO REF SOV: 003 OTHER: 008

Card 2/2

DZHRBASHYAN, V.A.

Total number of quanta emitted in a laminated medium. Izv. AN Arm. SSR. Ser. fiz.-mat. nauk 16 no.6:113-115 '63. (MIRA 17:8)

45368
S/056/63/044/001/030/067
B104/B144

24.6600

AUTHOR: Dzhrbashyan, V. A.

TITLE: Excitation of nuclei by slow charged particles

PERIODICAL: Zhurnal ėksperimental'noy i teoreticheskoy fiziki, v. 44, no. 1, 1963, 157-159

TEXT: Assuming that the nuclear forces are negligible by contrast with the Coulomb forces except for resonances related to the formation of a compound nucleus, and considering that the perturbation theory can be applied to Coulomb interaction, the author's dispersion formula for inelastic scattering can be used in a Coulomb field (Izvestiya AN ArmSSR (now printing))

$$d\sigma = \frac{M^2 v_f}{4\pi^2\hbar^4 v_i}\frac{1}{(2I_i+1)(2s+1)}\sum_{M_i M_f \mu_i \mu_f}\Big|\int u^*_{\mu_f}\varphi^*_f F^{-*}_{k_f} V^1 u_{\mu_i}\varphi_i F^{+}_{k_i}\, d\tau_c + \frac{4\pi^{5/2}\hbar^2}{M^2 v_i^{1/2} v_f^{1/2}}\sum_{l_f m_f} Y_{l_f m_f}(k_f)\sum_{l_i r M} i^{l_i - l_f}(2l_i+1)^{1/2}\exp i\,[\eta_{l_f}+\eta_{l_i}]\times \frac{H^{rM}_{Il_i 0\mu_i} H^{rM*}_{I_f l_f m_f s\mu_f}}{W - W_{rJ} + i\frac{\Gamma_{rJ}}{2}}\Big|^2 d\Omega. \qquad (1)$$

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(1) is represented as a sum $d\sigma = d\sigma_1 + d\sigma_{12} + d\sigma_2$, where $d\sigma_1$ is the differential cross section of Coulomb excitation, $d\sigma_{12}$ the differential cross section of the interference of Coulomb excitation and nuclear resonance excitation, $d\sigma_2$ the differential cross section of nuclear resonance excitation. For the calculation of $d\sigma_{12}$ and $d\sigma_2$,

$$H^{rM}_{jlsm\mu} = \sum_{\mu_j} (-1)^{l-s+\mu_j} (2j+1)^{1/2} \begin{pmatrix} l & s & j \\ m & \mu & -\mu_j \end{pmatrix} \times (-1)^{j-I+M} (2J+1)^{1/2} \begin{pmatrix} j & I & J \\ \mu_j & M_I & -M \end{pmatrix} U^{rJ}_{jlI}, \quad (3)$$

is considered (H.A.Bethe, G.Placzek, Phys.Rev., 51, 450, 1937), where U^{rJ}_{flj} is real.

$$\sigma_{12} = \frac{32\pi^{3/2} v^{1/2} Z_1 e}{\hbar v^{3/2} (2I_i+1)(2s+1)} \sum_{\lambda=1}^{\infty} \sum_{l_i l_f j_i j_f J} \langle I_i | \lambda | I_f \rangle (-1)^{s-I_i-J} \times$$

$$\times \left[(2l_i+1)(2l_f+1)(2\lambda+1)^{-1}\right]^{1/2} \begin{pmatrix} l_i & l_f & \lambda \\ 0 & 0 & 0 \end{pmatrix} M^{-\lambda-1}_{l_i l_f} \left[(2j_i+1)(2j_f+1)\right]^{1/2} \times \quad (4)$$

$$\times (2J+1) \begin{Bmatrix} l_i & l_f & \lambda \\ I_f & I_i & J \end{Bmatrix} \begin{Bmatrix} l_f & l_i & \lambda \\ l_i & l_f & s \end{Bmatrix} U^{rJ}_{j_i l_i I_i} U^{rJ}_{j_f l_f I_f} \frac{E_i + W_{N_i} - W_{rJ}}{(E_i + W_{N_i} - W_{rJ})^2 + \Gamma^2_{rJ}/4};$$

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B104/B144

Excitation of nuclei by slow ...

and

$$\sigma_2 = \frac{4\pi^2\lambda_i^2}{(2I_i+1)(2s+1)} \sum_{l_i l_i' l_f l_f' J} (2J+1) \left| \sum_r \frac{U^{rJ}_{il_il_i} U^{rJ}_{fl_fl_f}}{E_i + W_{N_i} - W_{rJ} + i\gamma_{rJ}/2} \right|^2. \quad (5)$$

are obtained by substituting (3) in (1), summation over the magnetic quantum numbers, and integration over the angles. If the energy of the incident particles is near the level $W_{rJ}-W_{N_i}$, then

$$\sigma_2 = \pi\lambda^2 \frac{2J+1}{(2I_i+1)(2s+1)} \frac{\gamma_i^{rJ}\gamma_f^{rJ}}{[E_i-(W_{rJ}-W_{N_i})]^2+\gamma_{rJ}^2/4}. \quad (6)$$

holds. The deviation of σ from $\sigma_1 + \sigma_2$ can be used to obtain knowledge of the matrix elements $U^{rJ}_{il_ij_i}$ and $U^{rJ}_{fl_fj_f}$ and to determine the sign of $\langle I_i \| \lambda \| I_f \rangle$. It follows from (4) that the contribution of the interference term, which is zero for S waves and small for P waves, becomes considerable for high levels of the compound nucleus. There is 1 figure.

ASSOCIATION: Fizicheskiy institut Akademii nauk Armyanskoy SSR (Physics Institute of the Academy of Sciences Armyanskaya SSR)

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Excitation of nuclei by slow ... S/056/63/044/001/030/067
B104/B144

SUBMITTED: May 26, 1962

Card 4/4

DZHRBASHYAN, V.A. (Yerevan)

Whipple's theorem. Zhur. vych. mat. i mat. fiz. 4 no.2:348-351
Mr-Ap '64. (MIRA 17:7)

L 16349-65 EWT(m) DIAAP

ACCESSION NR: AP4049204 S/0022/64/017/005/0099/0101

AUTHOR: Dzhrbashyan, V. A.

19

TITLE: Electromagnetic excitation of a nucleus by a slow particle with arbitrary spin

SOURCE: AN ArmSSR. Izvestiya. Seriya fiziko-matematicheskikh nauk, v. 17, no. 5, 1964, 99-101

TOPIC TAGS: multipole interaction, nuclear excitation, magnetic spin interaction, magnetic orbit interaction

ABSTRACT: Formulas are derived for the cross sections of 2^{λ}-pole and magnetic spin and magnetic orbit interactions. The formula for magnetic orbit interaction is similar to that obtained by L. C. Biedenharn et al. (Phys. Rev. v. 100, 1955, 376) and differs from that of K. Alder et al. (Rev. Mod. Phys. v. 28, 1956) because of some errors in the latter. The cross section for the magnetic spin

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L 16349-65

ACCESSION NR: AP4049204

interaction agrees with the results of the result of Biederhahn and Thaler (Phys. Rev. 104 v. 104, 1956, 1643) for s = 1/2 and s = 1. It is pointed out that for s > 1/2 (for example, excitation by deuterons) the M1 excitation cross section governed almost completely by the ratio of the two derived cross sections. Orig. art. has: 14 formulas.

ASSOCIATION: Fizicheskiy institut GKAE, Yerevan (Physics Institute GKAE)

SUBMITTED: 15Feb64

ENCL: 00

SUB CODE: NP

NR REF SOV: 003

OTHER: 003

Card 2/2

DZHRBASHYAN, V.A.

Interference effect due to excitation of Na^{23} by protons. Dokl. AN Arm. SSR 40 no.1:19-20 '65. (MIRA 18:7)

1. Fizicheskiy institut Gosudarstvennogo komiteta po ispol'zovaniyu atomnoy energii SSSR. Submitted February 25, 1964.

L 11213-66 EWT(d) IJP(c) SOURCE CODE: UR/0022/65/018/004/

30
B

ACC NR: AP6000902

AUTHOR: Dzhrbashyan, V. A. 44,55

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ABSTRACT: The methods for integrating the following Bessel function relations

$$\int_a^b t^\lambda E_\nu(\rho t)\,dt,$$

$$\int_a^b t^\lambda E_\mu(\rho t)\,\overline{E}_\nu(\sigma t)\,dt;$$

... domain of existence are discussed in detail. In the above integrals λ, μ, ... σ are real or imaginary numbers, and E_ν E_μ are Bessel function

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solutions. In part one, the analysis is limited to the case of $b = \infty$, and the following special example is used

$$\int_a^\infty t^\lambda K_\nu^2(t)\,dt,$$

where $K_\nu(t)$ is a MacDonald function. This integral is defined in the manner

$$\int_a^\infty t^\lambda K_\nu^2(t)\,dt = \Phi_{\lambda, K_\nu^2}(\infty) - \Phi_{\lambda, K_\nu^2}(a),$$

its limit of convergence stated, and subsequently $\Phi_\lambda(\infty)$ and $\Phi_\lambda(a)$ are calculated in terms of gamma functions using methods outlined by G. I. Watson (Theory of Bessel Functions, 1949). In part two, b is assumed to be arbitrary, and the integral $\int_a^b$ is assumed to be the difference of $\int_a^\infty$ and $\int_b^\infty$. The limit "a" is assumed to be small, and the integral is represented by

$$\int_a^b t^\lambda K_\nu^2(t)\,dt \sim \Phi_{\lambda, K_\nu^2}(\infty) - \Phi_{\lambda, K_\nu^2}(a) - F_{\lambda, K_\nu^2}(b) \;.$$

As an example, the following special case is investigated

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